Akaroa Wastewater Meeting – 9 November 2016 – Gaiety Hall

Questions and answers from meeting:

Question	Answer
1. What is the normal rain level for this area?	Records taken in Pipers Valley indicate an annual rainfall of 1,100 mm per year. The average annual rainfall used in the soil moisture balance assessment is 1,085 mm per year, based on historical rainfall data from NIWA's Akaroa Electronic Weather Station.
2. Has any consideration been given to May 2016 being a very dry month? Was this therefore an appropriate time to be carrying out the tests?	The tests of the surface soils is independent of the time of year. The measurement of particular interested is the rate of infiltration when the soil is saturated. The test is run for as long as required to saturate the soil so that the saturation infiltration rate can be measured. If the ground had been wetter the saturated rate may have been achieved in a shorter time.
3. Where is the image of drip irrigation on the slideshow you have presented?	This image is of the Wainui wastewater irrigation to land system on the other side of Akaroa Harbour. This area is in established pine forest.
4. Does grass grow in between the trees being irrigated?	When the tree canopy has formed, little light gets in so the grass does not grow and the ground would be in covered in leaf litter.
5. How can I get the detailed information on the water balance calculations?	All the detailed calculations and assumptions made in the determination of irrigation rates and water balances will be available through Andrew Dakers (acting on behalf of Robinsons Bay residents). Andrew has agreed that he will sit down with PDP staff to review and fully understand the basis of all the calculations.
6. Can other people please have access to the same technical information?	The methodology for the water balance model is described in Section 4.5.2 of the Akaroa Wastewater - Concept Design Report for Alternatives to Harbour Outfall (CH2M Beca, May 2016). The water balance model is in MATLAB and involves extensive coding which cannot be provided. However, the inputs and outputs from the model can be provided on request to bridget.obrien@ccc.govt.nz.
7. Can you please tell us what the soil capacity is?	The soil capacity is not specified. The relevant parameter is the Plant Available Water. This is the water in the soil profile available for uptake by the plants. This will vary with the rooting depth of the plants and the nature of the soil.
8. Where can we find examples of buffer distances from treated wastewater irrigation?	Blenheim (MDC consent U071181) Spray irrigation of wastewater shall not occur within 10 metres of flowing surface water. Drip irrigation of wastewater shall not occur within 3 metres of flowing surface water Only drip irrigation can be used within 25 metres of boundaries. Note there is no limit of how close to the boundaries that it can be used. Spray irrigation buffer distances vary from 25 metres to 80 metres. This was a function of the types of irrigators proposed at the time of the consent application. Rolleston (ECan Consent CRC101109) Median wastewater E. coli concentration 500 colony forming units (cfu) per 100 mL. (Note the design treated wastewater quality for Akaroa for E. coli is 10 cfu/100mL in winter and 100 cfu/100 mL in summer.) Spray irrigation (centre pivot and k-line): 15 m from boundary with compliant boundary shelter planting. Greytown (Greater Wellington Regional Council Consent WAR080254) 25 m setback for spray irrigation with buffer planting. Note it has been assumed that a suitable mix of trees and shrubs would be planted on the boundaries as further buffer to the irrigation.
9. We have nut trees, can we still eat our fruit and vegetables if they have been irrigated with treated wastewater?	The wastewater will be treated to a very high quality and once it has passed through soil it would be safe to grow food crops such as walnuts. There are no industries in Akaroa so the concentrations of metals are extremely low (see Table 8-4 in the Akaroa Wastewater Scheme Upgrading Resource Consents Application and Assessment of Effects on the Environment (CH2M Beca, 2014), so would not be an issue in the plants that took up the treated wastewater. It is not recommended to spray the treated wastewater directly onto vegetables, as there may still be some pathogens (viruses) present. However, these will die off quickly in the soil, so there would be no health risk in eating fruit and vegetables grown near the irrigation areas.
10. Will the treated wastewater that is irrigated end up in our streams?	All water that falls on a catchment either by rain or by irrigation will either be evaporated into the air, evapotranspirated through the plants into the air or will flow through the ground. Depending on the movement of the groundwater some of the groundwater will emerge into the streams and then into coastal water, while the remainder will pass directly into the coastal water. Any water that enters the streams will be a mixture of rainwater and irrigated wastewater. The irrigated wastewater will have received further treatment as it passes through the soil (such as nutrient uptake by plants, filtration, die-off of any remaining pathogens, absorption and adsorption to soil particles).
11. Does the Resource Management Act (RMA) prevent the treated wastewater from being permitted to discharge into waterways?	The RMA requires that with any treated wastewater discharge, consideration must first be given to a discharge to land. Only if that discharge to land is not shown to be efficient, effective or feasible can consideration of discharge to a water body be considered.

<table>
<tr><th>Question</th><th>Answer</th></tr>
<tr><td>12. Can we please have research on the water quality at treatment plants, as opposed to relying on what you are telling us?</td><td>
<table>
<tr><th>Wastewater Discharge Parameter (AVERAGE)</th><th>Christchurch Wastewater Treatment Plant</th><th>Akaroa – existing treatment plant</th><th>Motueka membrane treatment plant</th><th>Tirau membrane WWTP</th><th>Te Aroha membrane WWTP</th></tr>
<tr><td>Total suspended solids (mg/L)</td><td>25</td><td>20</td><td>4</td><td>4</td><td><3</td></tr>
<tr><td>Biochemical oxygen demand (mg/L)</td><td>10</td><td>10</td><td>3</td><td>3</td><td><1</td></tr>
<tr><td>Total nitrogen (mg/l)[1]</td><td>30</td><td>30</td><td>15</td><td>unspecified</td><td>22</td></tr>
<tr><td>Faecal coliforms (cfu/ml)</td><td>65,000[2]
200[3]</td><td><10</td><td>5</td><td><50</td><td><2</td></tr>
<tr><td>Virus reduction</td><td>not measured</td><td>not measured</td><td>3 log reduction</td><td>unspecified</td><td>unspecified</td></tr>
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Notes. 1. TN relates to biological treatment process employed rather than the membrane separation
2. Measured at the discharge of the treatment plant to the oxidation ponds
3. Measured at discharge from oxidation ponds to outfall pipeline
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<tr><td>13. Does this take into account the water flow in wet weather into the treatment plant?</td><td>Yes wet weather flows are included in the design flows. The average flow is 4 litres per second (L/s) and the peak wet weather flow is 65 L/s, taking into account population growth to 2041.</td></tr>
<tr><td>14. How accurate are the purple areas marked on the slideshow? One of those areas marked I know is a gully so would be unsuitable.</td><td>The areas shown on the plans are indicative of land with suitable slope from the LIDAR information available. These areas will contain some areas that will not be suitable for irrigation, through land use, localised topography, springs etc. and there may be some areas outside the areas shown on the plans that could be suitable for irrigation. These plans should be considered a “first cut” at identifying potentially suitable land areas. The next stage of the concept development would need to include more accurately defined topographical survey.</td></tr>
<tr><td>15. Where are the testing bores located at Robinson’s Bay?</td><td>See slide 29 in the presentation given on 9 November.</td></tr>
<tr><td>16. How accurate are the costings? They appear to be going up since the last presentation provided to the community on this project.</td><td>The cost estimates are concept level only and are accurate to ±30%. The cost estimates have been updated since the last presentation to the community to reflect the changes in the concept design.</td></tr>
<tr><td>17. Will further effects be considered as part of the resource management act (RMA) process such as the impact on the sea?</td><td>Any resource consent process under the RMA requires an assessment of environmental effects and for a project of this nature that assessment will be extensive and comprehensive.</td></tr>
<tr><td>18. Where is the Lincoln University study located?</td><td>The Lincoln University Native Species Irrigation Trial is at 82 Pipers Valley Road. This trial is using treated wastewater from the Duvauchelle Wastewater Treatment Plant on SH75, which is of a lesser quality than proposed for Akaroa. The soil lysimeter trial on undisturbed cores of soil taken from the Duvauchelle Golf Course and from Takamatua Peninsula is being carried out at the Lincoln University outdoor soil lysimeter laboratory at Lincoln University.</td></tr>
<tr><td>19. Can we please have more information on the long term use of effluent on food sources?</td><td>In the western world it would not be normal practice to apply treated effluent to leafy vegetables or directly consumed root crops. There are however many examples of treated effluent being applied to other crops that are used for human consumption.</td></tr>
<tr><td>20. If the treatment process won’t eliminate all viruses, then what happens after long term exposure to these viruses?</td><td>It is possible that viruses can pass through the intended membrane treatment process. For these viruses to be a health risk one or more of the viruses would need to be ingested by a person. In many cases the dose required to contract a virus infection is tens or hundreds of viruses. Drinking of the treated reclaimed wastewater would be risky depending on the health of the community contributing to the wastewater treatment plant. Viruses will not always be present in the wastewater and therefore there will never be a ‘long term exposure’ to them. Even if viable viruses are present in the treated reclaimed wastewater they would need to survive in the soil and eventually passed into a stream that was the source of water for a potable supply. The level of pathogens that could potentially adversely affect human health would be much higher from runoff into the streams from farmed catchments.</td></tr>
<tr><td>21. Of all the potential contaminants, did the Lincoln University study only test for nitrates?</td><td>Lincoln University tested the treated wastewater from the Duvauchelle Wastewater Treatment Plant for all the elemental contaminants, including heavy metals and plant nutrients. The concentrations of heavy metals in the tested effluent were negligible. Pathogens, antibiotics, and endocrine disrupting compounds were outside the scope of Lincoln University’s work. These contaminants have been widely studied in other systems. A literature review could form part of a future project.</td></tr>
<tr><td>22. What happens to the other nutrients from the Lincoln University study?</td><td>Lincoln University has determined the concentrations of other plant nutrients in the treated wastewater, soils and pasture. These results will be included in the final report in June 2017.</td></tr>
<tr><td>23. Is the Lincoln University study going to provide crop factors?</td><td>We will determine the crop factor for the irrigated pasture, which we anticipate to be 1.0. The non-irrigated pasture will have a lower crop factor because of a reduction in evapotranspiration caused by drought stress. In a separate project, we will determine the crop factor for manuka. These results will be available in 2019. Crop factors for a planted area, rather than an individual tree in a paddock, are rarely greater than about 1.2.</td></tr>
<tr><td>24. What is the Council doing and proposing to do with water conservation?</td><td>The Council now requires all new builds on the Port Hills and Banks Peninsula to install rainwater tanks that are intended as storm water retention tanks to reduce adverse stormwater impacts. The water can then be used instead of the potable water supply for non-potable uses in the house or for garden irrigation.
Water restrictions are in place in Akaroa in each summer period. The level of restriction is closely linked to the flows in the streams from which the water supplies are taken.</td></tr>
<tr><td>25. Are the systems being proposed the only system suitable for Banks Peninsula? What else has been investigated?</td><td>In December 2011 the Council resolved that the new Akaroa Wastewater Treatment Plant would be designed to produce the best quality wastewater at the time. The site for the new wastewater treatment plant is relatively small, so a compact wastewater treatment plant is required. Wastewater treatment options were assessed in Section 7.4 of the Akaroa Wastewater Scheme Upgrading Resource Consents Application and Assessment of Effects on</td></tr>
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Question	Answer
	the Environment (CH2M Beca, 2014). Four other reports have considered options for treating and disposing of Akaroa's wastewater: · Akaroa Wastewater Concept Design Report for Alternatives to Harbour Outfall (CH2M Beca, May 2016) o Appendix A - Overview of Scheme in Consent Application o Appendix B - Peer Review and Response to Peer Review o Appendix C - Hydrogeological Report o Appendix D - Area Overview Drawing o Appendix E - Location Maps o Appendix F - Geotechnical Figures o Appendix G - Planning Maps o Appendix H - Resource Consents Required o Appendix I - Disinfection Through Wetlands o Appendix J - Wainui Wastewater Scheme Monitoring Reports o Appendix K - Environment Canterbury Review · Akaroa Wastewater Options and Risk Analysis (Harrison Grierson, ecoEng and Golder Associates, February 2010) o Akaroa Wastewater Options Harbour Discharges - Risk Analysis (Golder Associates, October 2009) (Appendix 6 to Akaroa Wastewater Options and Risk Analysis) · Akaroa Wastewater Selected Options 2008 (MWH, October 2008) · Akaroa Integrated Water Management Strategy - Part 6 - Wastewater Treatment Options (MWH, February, 2008)
26. Why is there no mention of the location of the ponds?	The location of the pond has not been chosen yet. There are many possible pond locations within the areas shown as being possibly suitable for irrigation (shown in purple on Slides 27, 28, 32, 33 and 37 of the presentation given on 9 November.
27. Will the visual impact of the ponds be considered for neighbours?	As part of the assessment of environmental effects (a requirement of the RMA process) visual impacts are a key consideration and where these are determined to have an impact the impacts will need to be mitigated.
28. Is it only the storm water that isn't treated in heavy rainfall or a wet weather event?	While in theory the wastewater network only conveys wastewater, the reality is that groundwater and stormwater get into the wastewater network through cracks in the pipes, direct connections (e.g. downpipes from roofs accidentally connected to the wastewater system) and flooded manholes. This means that the capacity of the wastewater network can be exceeded, and overflows of untreated wastewater to the beach can occur. This is the subject of a separate process to obtain a resource consent for wet weather overflows to the environment for Christchurch city, Lyttelton Harbour and Akaroa Harbour. Information about that can be found on the wastewater overflow consent webpage. The new terminal pump station in the Childrens Bay boat park will pump wastewater up to the treatment plant at a rate of up to 65 litres per second (L/s) (normal flows are 4 L/s). The treatment plant will be designed to fully treat at a rate of 14 L/s, which will be most wastewater flows, except for large storms (expected to be once or twice a year). During a large storm, wastewater that exceeds the capacity of the main treatment plant and flow buffer tank will receive primary treatment (fine screening and grit removal) and UV disinfection, so will be of a slightly lower quality than usual. The proposed treated wastewater quality is shown in Table 4-4 of the Akaroa Wastewater Scheme Upgrading Resource Consents Application and Assessment of Effects on the Environment (CH2M Beca, 2014).
29. Is the pump station proposed at Childrens Bay consented for?	Consents have already been granted for the pump station at Childrens Bay, along with consents for upgrading the reticulation and the new treatment plant proposed for Old Coach Road.
30. How does adding water to the ground for future years get modelled?	The water balance and modelling is done on the basis of flows expected in 2041, based on expected population and tourism growth.
31. Can we please have included some options for this project where the water is re-useable for the future and not dumped in other areas?	The concept of all land application is to reuse the water in a beneficial manner. The option of non-potable (toilet flushing and garden watering) reuse in Akaroa has also been investigated and while a viable (but costly) option this would only use about 20% of the total reclaimed water.
32. The results of the previous consultation had around 50% support for the harbour outfall, so why is Council going ahead with the same options in a different location?	The Council will be making a Local Government Act (LGA) decision on the wastewater discharge option to pursue. The Council must take into account social, cultural and economic interests; the option must be efficient, effective and appropriate; and the option must be consentable as sustainable management under the RMA. Discharge to water is not sustainable management under the RMA unless options that avoid discharge to water have been adequately investigated and reasonably discounted. The option that the Council will select is not decided by popular vote, but the views of the people contributing to the consultation process will be a key part of the Council decision making.
33. Is there any way that the Council can use money from the cruise ships and put that into a wastewater project?	The Council already collects fees from the Cruise ship industry based on passenger numbers. These funds are part of the wider revenue stream for the Council and are not currently targeted at any specific project. The Council has already budgeted for the Akaroa wastewater scheme in its Long Term Plan.

Question	Answer
34. Why did Ngai Tahu join the appeal if they didn't support the outfall option?	Any person or group who was a submitter to the original consent has the right to join the appeal to any consent decision. Joining the appeal ensures that whoever does so becomes a party to the resolution of that appeal, and can provide input.
35. Has consideration been given about the cruise ships being due on 19 November? So therefore this would not be an appropriate date to hold a second meeting.	This meeting has been postponed and a new meeting programmed for Robinsons Bay, Takamatua Valley and Pompeys Pillar land owners and residents.
36. Are stock permitted to graze on land that has been irrigated with treated wastewater? Is there a stand down period if the stock are to be used as a food source commercially?	Historically human wastewater has been treated to a level where diseases can potentially be irrigated onto pasture. If cattle graze the irrigated pasture too soon after the irrigation then there is the potential to transfer the diseases from humans to cattle. The main concern was around the beef tape worm (*Taenia saginata*). The withholding period for when stock could not enter a paddock irrigated with human wastewater was typically around 30 days. At Akaroa the proposal is to use an advanced treatment system which will prevent most diseases (and in particular the cysts of the beef tapeworm) from being present in the treated wastewater to be irrigated. This presents the opportunity to consider reducing the withholding time between irrigation and grazing. The use of the land by any type of stock and any withholding requirements will be considered further as options are considered in more detail.
37. Could there be a tap at the recreation ground for people to re-use the treated wastewater?	Treated wastewater could be used in Akaroa for all of the options. The wastewater will be treated to a very high standard and could be used for non-potable reuse, such as toilet flushing water, garden watering, boat washing (but not for drinking). However, a pipe to convey treated wastewater for reuse in Akaroa is not within the current scope of the project.
38. Why was the site of the new treatment plant (yet to be built) chosen?	This site was chosen from a choice of two sites where there were willing sellers of suitable land. For further details refer to Section 7.3 of the Akaroa Wastewater Scheme Upgrading Resource Consents Application and Assessment of Effects on the Environment (CH2M Beca, 2014).
39. Will the wastewater pipes have to be dug up again?	Wastewater pipes once installed are not normally dug up again unless a repair is necessary.
40. Have Council considered a botanical system with a re-useable solution? I have seen an example of a greenhouse surrounding a treatment plant with a lake next to it.	The Council has already resolved to provide the best quality treatment that modern proven plants can provide so that any reuse option is then viable. Irrigation to land is a viable reuse option. The storage pond could be designed and landscaped to be an attractive lake.